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Agricultural Research Administration
Forest Insect Laboratory
Coeur d'Alene, Idaho

October 3, 1945

Regional Forester,
Federal Building,
Missoula, Montana.

Dear Sir: (Attention: Mr. Lindh)

I am enclosing three copies of a statement concerning the insect situation of Region One which I sincerely trust will be of some service to you. You told me to prepare this paper in considerable detail and you would take from it what information you desired for your final report. It is trusted that I have included those data which you desire.

I am sorry that I have not been able to get this statement to you at an earlier date, but there has been a serious conflict between field and office activities. I trust this delay has caused you no inconvience.

Sincerely,

James C. Evenden,
Senior Entomologist.

Enclosure

cc: F. C. Craighead,
F. P. Keen,
R. L. Furniss,
W. D. Wygant,

DICTATED BY MR. EVENDEN BUT SIGNED IN HIS ABSENCE TO AVOID DELAY

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
WASHINGTON, D.C.
Agricultural Research Administration
Forest Insect Laboratory
Coeur d'Alene, Idaho

October 3, 1945

THE FOREST INSECT SITUATION OF REGION ONE

INTRODUCTION

The forest insect situation within the forests of Region One presents a problem not only of protection but one that is closely associated with forest management, which is of no small magnitude. Furthermore, it does not diminish in importance when one dares to base the future upon what has occurred in the past. The importance of this forestry problem has prompted the preparation of this paper depicting the insect situation throughout the region as it has been in the past and as we know of it at this time. It is hoped that this information will provide a new look at the problem and that we may better evaluate its role in the successful practice of forestry.

There is no place in forestry for the destruction of timber by insects. Perhaps in the past we have been prone to accept standing and down snags of bug killed trees as an unpreventable part of all mature forests. This reasoning is as false as the philosophy that a few fleas are good for any dog. At the present time it is fully realized by all who are familiar with existing conditions that the loss of timber that has and is still occurring can no longer be endured if proper benefits are to be derived from forest lands.

Although interested in the many insects which play a more or less unimportant role as enemies of forest trees, our first consideration is directed to those species which attack and destroy trees of all sizes and ages. Fortunately in this classification there are relatively few species and these fall naturally into two groups which the forester can consider as defoliators and bark beetles.

In the defoliator group there are a few insect species which appear from time to time in epidemic populations. The actual damage associated with these unpredictable outbreaks is dependent upon the severity of the injury and the number of years it continues. Forest trees withstand

foliation although a complete loss of foliage is fatal. During outbreaks of some species, (i.e. spruce attack is most severe in the upper portion of the crown ts for the top killing associated with such epidemics. ly we have but little data concerning the actual loss of sociated with outbreaks of these insects, however, in many it has been extremely severe. Such losses involve not only al value of the timber destroyed, but severe fire hazards are reated.

Although there are a large number of bark beetles, only a few species attack healthy resistant trees. However, under favorable breeding conditions, there are a few other species usually considered as secondary in their attacks which often build to such populations that for a short time they become of primary importance. Outbreaks of such beetles are usually of short duration.

FOREST DEFOLIATORS
Records of Past Outbreaks

To make the story of past forest defoliation as complete as possible, outbreaks that have occurred within the Idaho forests of Region Four as well as those within the Yellowstone National Park and Shoshone National Forest have been included as a part of this record. It is thought that this additional information will permit a better realization of the importance of these forest enemies.

SPRUCE BUDWORM (Cacoecia fumiferana)

1921 - 1926

Severe defoliation of the timber stands on some 10,000 acres along the Yellowstone River in the northern portion of the Yellowstone National Park. Throughout this area there were large acreages on which all Douglas fir trees were killed. The total loss was estimated to be 30 percent of the entire stand.

1922 - 1926

Small infestations at New Meadows, Idaho, and at Priest Lake, Idaho. Considerable top-killing of white fir but no serious timber losses.

1922 - 1936

In the Shoshone (Cody) Canyon to the east of Yellowstone National Park the Douglas fir on some 50,000 acres was severely defoliated

considerable defoliation although a complete loss of foliage is nearly always fatal. During outbreaks of some species, (i.e. spruce budworm) the attack is most severe in the upper portion of the crown which accounts for the top killing associated with such epidemics. Unfortunately we have but little data concerning the actual loss of timber associated with outbreaks of these insects, however, in many instances it has been extremely severe. Such losses involve not only the actual value of the timber destroyed, but severe fire hazards are often created.

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during this period. Damage varied from 100 percent kills over large areas to areas where no permanent injury followed. Total loss was at least 50 percent of the trees.

1924 - 1928

An outbreak of this insect in northern Idaho reached its peak in 1927 covering an area of approximately 790,000 acres. There were large infested areas on the Coeur d'Alene, Clearwater, Kaniksu, Nezperce, Selway, and St. Joe National Forests. All tree species were attacked, and although there was considerable killing of white fir the total damage was not severe.

1928 - 1935

Severe defoliation of lodgepole in the southwest corner of the Yellowstone National Park. Infested area included some 15,000 acres on which 25 percent of the trees were killed.

1932 - 1942

During this period there were 23 small localized outbreaks of the spruce budworm reported from the forests of Idaho and Montana. Only a few of these outbreaks reached such epidemic proportions that any permanent damage followed the defoliation.

PINE BUTTERFLY (Neophasia menapia)

1922 - 1923

The pine butterfly is present at all times in the white pine stands of northern Idaho, yet there are no records of it having occurred in an epidemic form on this tree species. The last serious outbreak of this insect occurred in the ponderosa pine stands of central Idaho on the heads of the Little Salmon and Payette River watersheds. Large areas of mature pine were heavily defoliated and approximately 25 percent of the mature trees failed to recover from the injury. This outbreak stopped as suddenly as it started. Dates of previous outbreaks of the pine butterfly in the northwestern United States are as follows.

1882 - Spokane, Washington
1883 - Seattle, Washington
1890 - Olympic Mountains
1895 - Olympic Mountains
1896 - British Columbia
1894 - Snow Line, Mt. Hood
1895 - Goldendale, Washington
1898 - Boise, Basin
1899 - Moscow Mountain, Idaho
1903 - Mount Adams, Washington
1907 - Spokane County, Washington
1907 - Alpha, Idaho.

DOUGLAS FIR TUSSOCK MOTH (Hemerocampa pseudotsuga)

1918

The Douglas Fir Tussock moth was reported first from Chase, B. C., in 1918, where it destroyed areas of Douglas fir.

1927

Reported from Jarbridge, Nevada, as seriously defoliated alpine fir. Heavy losses followed.

1928

Outbreaks occurred on the Boise and Weiser National Forests of Idaho and at the Craters of the Moon National Monument. Several thousand acres of Douglas fir were covered by these outbreaks, and the timber losses were severe on the National Forests. Lumber values were involved on the National Forests and severe fire hazards created.

Scattered outbreaks occurred in northeastern Washington in the vicinity of Northport, Washington, which in all covered some 10,000 acres. It was estimated that 50 percent of the Douglas fir trees within these areas were killed as a result of the defoliation.

1936

Several large spots of tussock moth infestation occurred on the East Fork of Wood River, Sawtooth National Forest. These outbreaks covered some 3000 acres on which a large percent (30%) of the trees were killed.

HEMLOCK LOOPER (Ellopia fiscellaria lugubrosa)

1937 - 1939

During the 1937 season 57 spots of severe "Looper" defoliation were either reported to the Forest Insect Laboratory at Coeur d'Alene, Idaho, or were observed by its officers. These areas, which varied from a few acres to several thousand, were for the most part along the ridge tops conforming to areas of true fir type. These 57 areas of looper infestation represented only the severe defoliations and did not include the light attacks which were reported as scattered throughout entire forest ranger districts. As these areas of infestation were distributed throughout the forests of northern Idaho and western Montana, it can be assumed that there were other spots of defoliation which were not recorded. The total acreage of the area defoliated is not known but it would be several hundred thousand acres. The loss of timber is estimated as being 60 percent of the severely defoliated trees.

LARCH SAWFLY (Nematus erichsonii)

1934 - 1944

An outbreak of the larch sawfly was recorded on the Flathead National Forest near the Canadian border in 1934. The previous season it had been reported from an area in Canada to the north of the Flathead. It is not known if this outbreak originated from the forests of the Lake States or if the insects were indigenous to this region. During subsequent years the infestation spread throughout the larch forests of western Montana and northern Idaho which seemed to give strength to the possibility that the insects originated from some source outside of the region. Although the insects were still active in 1943 the severity of the defoliation was greatly reduced over that of 1942. No losses of timber have been recorded.

LODGEPOLE SAWFLY (Neodiprion burkei)

1924 - 1927

An outbreak of this insect at West Yellowstone, Montana, defoliated the lodgepole pine trees on approximately 13,000 acres on which practically all trees were killed. Trees were for the most part small and of no great value other than for scenic purposes and of course future timber supplies. These areas of dead timber have been serious fire hazards and several of them have been burned.

The lodgepole pine needle tier (Argyrotaenia pinatubana) was present in the West Yellowstone area at the time the sawfly was active. However as the tier infestation continued after the sawfly outbreak subsided, and there was no further loss of timber, the later species was considered as the primary insect responsible for the death of the trees.

LESS IMPORTANT FOREST DEFOLIATORS OF IDAHO AND MONTANA

Black-Headed Budworm (Peronea variana) Defoliated Douglas fir in sothwest corner Yellowstone National Park in 1923. No serious damage.

Two-Lined Larch Sawfly (Platcampus laricis), and Western Larch Sawfly (Platycampus laricivorus), appeared in epidemic numbers throughout the larch stands of northern Idaho in 1921, and then again in a few small areas in 1938. No loss of trees recorded. Outbreak only lasted one season.

Lodgepole Pine Needle Tier (Argyrotaenia pinatubana) occurred in what was assumed to be epidemic numbers at West Yellowstone in 1924. It is

still active in that area with no apparent injury to the trees. In other areas where lodgepole pine is growing on poor soil it seems to do considerable damage but is even then considered as secondary to the soil.

Forest Tent Caterpillar (Malacosoma disstria) defoliated alder and other decidious trees and shrubs on the Coeur d'Alene Forest in 1942 and 1943.

Box Elder Leaf Miner (Gracilaria negundella) Severe infestation in the vicinity of American Falls, Idaho, in 1938. No permanent injury.

Box Elder Defoliator (Acronicta americana) defoliated box elder trees in area around Shoshone, Idaho in 1938. No permanent injury to trees.

Alder Flea Beetle (Haltica bimarginata) from time to time appears in epidemic numbers and defoliates large areas of alder.

FOREST DEFOLIATORS
Record of Present Outbreaks

SPRUCE BUDWORM (Cacoecia fumiferana)

Since 1940, severe outbreaks of the spruce budworm have existed in Douglas fir stands on the Helena and Gallatin National Forests. In some of the infested areas the outbreak has died down to where no further defoliation is evident, while in other drainages the destructive insect populations still occur. During the past season, new areas of infestation were recorded on both the Helena and Gallatin Forests. Although there has been no serious loss of timber even in areas where the defoliation has persisted for some years, there has been considerable top killing of trees. As yet, there is no record of Douglas fir beetles attacking the weakened trees.

There is an outbreak of the spruce budworm in hemlock stands on the Coeur d'Alene National Forest which, during the past seasons, resulted in considerable top killing. A saw fly, the identity of which has not been positively established, is working in association with this insect. A spruce budworm infestation in Douglas fir was also reported from the Deerlodge Forest and it is assumed that there are other infested areas of which we have no record.

DOUGLAS FIR TUSSOCK MOTH (Hemerocampa pseudotsugae)

In 1944, an isolated Douglas fir tree in a farm yard near Rathdrum, Idaho, was severely defoliated by the Douglas fir tussock moth. During the 1945 season eight small spots of a few Douglas fir trees around farm houses and residents in northern Idaho were found to be badly infested by this insect, and it is not expected that this record is

throughout the forests of Idaho and western Montana. This insect is present in all mature white pine stands, although the severity of the losses associated with its activity varies from year to year. Epidemics appear, but after a few years decrease in severity to what is known as a normal infestation only to reappear some few years later in epidemic populations. One only has to visit a white pine area to realize the destruction which has and is still occurring, as well as the importance of the role which in the future this insect will play in the successful practice of forestry. It is estimated that since 1910 a total of 3,447,360 M.B.F. of western white pine has been killed by the mountain pine beetle within the forests of Region One. Knowledge as to variations in the severity of this infestation during this period has been used to break the total loss into decades as follows:

1910-1919	1920-1929	1930-1939	1940-1945
1,137,628 MBF	861,840 MBF	1,137,628 MBF	310,262 MBF

Ponderosa Pine

The mountain pine beetle (Dendroctonus monticolae), and the western pine beetle (Dendroctonus brevicomis), are two bark beetles responsible for the loss of large volumes of ponderosa pine. In Montana, most of the ponderosa pine loss resulted from attacks of the mountain pine beetle, while in Idaho the western pine beetle was primarily responsible. In all mature ponderosa pine stands there is a constant loss of old decadent trees. From time to time these so called normal infestations increase to epidemic proportions, and during such outbreaks large numbers of trees are killed with no apparent selection of decadent or weakened individuals. During the past 35 years it is estimated that these insects have been responsible for a loss of 5,463,500 M.B.F. of ponderosa pine. An allocation of this loss to decades follows.

1910-1919	1920-1929	1930-1939	1940-1945
819,525 MBF	2,458,575 MBF	819,525 MBF	1,365,875 MBF

Douglas Fir

The Douglas fir beetle (Dendroctonus psuedotsugae) has been responsible for the killing of a tremendous volume of Douglas fir during the period covered by this report. These losses are not confined to small areas, but are distributed throughout the Douglas fir forests of the Northern Rocky Mountains. In some areas the loss is light and confined to scattered decadent trees. In other timber stands, epidemics have resulted in the destruction of a large percent of the merchantable volume. An estimate of Douglas fir killed during the past 35 years within Region One is placed at 4,388,475 M.B.F. We do not have sufficient data to break this loss down into decades, other than an equally division.

1910-1919	1920-1929	1930-1939	1940-1945
1,228,773 MBF	1,228,773 MBF	1,228,773 MBF	702,156 MBF

Alpine Fir and Grand Fir

These two tree species are attacked and killed by the western balsam bark beetle (Dryocoetes confusus) and the fir engraver beetle (Scolytus ventralis) respectively. This loss is distributed throughout all mature timber stands and although in some areas it has reached epidemic proportions, for the most part it occurs as small scattered groups and single trees. Sufficient data are not available to permit a very accurate figure as to past losses, however our estimate for the past 35 years have been safely placed at 1,219,120 M.B.F. This loss has been broken into decades as hereshown.

1910-1919	1920-1929	1930-1939	1940-1945
365,736 MBF	304,780 MBF	426,692 MBF	121,912 MBF

Western Hemlock

Perhaps many foresters would say that it is unfortunate we do not have bark beetles which destroy western hemlock. Be that as it may, our past losses of hemlock have been confined to injury from defoliating insects.

Larch

Western larch is quite resistant to insect enemies. In some instances seriously weakened trees may be attacked by the Douglas fir bark beetle. Dying and felled trees are attacked by a number of small bark beetles, none of which are considered as being primary in their attack. The western larch round headed borer (Tetropium velutinum), which works between the bark and wood, is sometimes suspected of having killed healthy larch trees. We have no data which would permit us to even make an estimate as to the loss of larch from insect attack.

Engelmann Spruce

The Engelmann spruce beetle (Dendroctonus engelmanni) has been responsible for the destruction of a great volume of Engelmann spruce within the forests of Region One. In all mature spruce timber stands there is a constant loss of old decadent trees as a result of this insects activity. When epidemics occur, practically all trees above 10 or 12 inches in diameter are killed. From 1934 - 1937 there was a general outbreak of the Engelmann spruce beetle throughout the Northern Rocky Mountains. In the northwest corner of the Yellowstone National Park,

where heavy stands of spruce occurred, the loss was placed at 75% of the trees above 10 inches in diameter. Comparable losses were experienced in other regional areas. The loss of spruce during the past 35 years has been safely placed at 1,199,240 M.B.F. These losses are distributed through the decades of this period as follows:

1910-1919	1920-1929	1930-1939	1940-1945
239,848 MBF	239,848 MBF	599,620 MBF	119,924 MBF

During the past few years there has been a severe outbreak of this destructive beetle within the spruce stands of the Colorado Forests.

Lodgepole Pine

The mountain pine beetle (Dendroctonus monticolae) was responsible for the tremendous destruction of lodgepole pine throughout the forests of Idaho and Montana which occurred some 25 or 30 years ago. A description of the infestation responsible for most of this loss is covered in a report submitted under date of May 6, 1944, entitled "Montana's Thirty Year Mountain Pine Beetle Infestation". The seriousness of this infestation is known to all foresters familiar with these lodgepole pine areas, so it seems unnecessary to repeat any portion of the story. The total loss of lodgepole pine within the forests of Region One is placed at 6,112,010 M.B.F., a figure of which I am sure does not tell the full story. These losses have been broken down into decades as follows:

1910-1919	1920-1929	1930-1939	1940-1945
1,772,482 MBF	2,261,443 MBF	2,016,963 MBF	61,120 MBF

SUMMARY OF TIMBER LOSSES FROM
BARK BEETLE ATTACK

Tree Species	Period Thousand Board Feet 1910-1919	1920-1929	1930-1939	1940-1945	Total 35 Year Period
White Pine	1,137,628	861,840	1,137,628	310,262	3,447,358
Ponderosa Pine	819,525	2,458,575	819,525	1,365,875	5,463,500
Douglas Fir	1,228,773	1,228,773	1,228,773	702,156	4,388,475
Alpine & Grand Fir	365,736	304,780	426,692	121,912	1,219,120
Engelmann Spruce	239,848	239,848	599,620	119,924	1,199,240
Lodgepole Pine	1,772,482	2,261,443	2,016,965	61,120	6,112,010
	5,563,992	7,355,259	6,229,203	2,681,249	21,829,703

PRESENT BARK BEETLE SITUATIONS

Without attempting to give actual figures, it can be properly stated that in most all of our mature timber stands there is a constant annual loss resulting from bark beetle activity. This loss varies from a low annual endemic figure which continues year after year to serious losses in timber stands where epidemic conditions prevail.

During the past year it has been quite evident that there is a marked increase in the severity of the mountain pine beetle infestation in all mature white pine stands. In 1944, an epidemic condition existed within the Pete Creek drainage of the Kootenai National Forest and control measures were instituted in the spring of 1945. Control measures were also instituted on the Coeur d'Alene National Forest against an infestation which although not considered as being greatly above a normal condition, was sufficiently severe to warrant the action taken.

A serious mountain pine beetle outbreak in mature ponderosa pine now exists within the Lincoln Basin on the head of the Blackfoot River, Montana, and in the Avon Valley adjacent. In these areas, which experienced severe timber losses during the mountain pine beetle epidemic of 1924, a large percent of the residual ponderosa pine stocking has already been destroyed during the past two seasons and there is no reason to assume that there will be a cessation in the severity of this outbreak in 1946.

There is a constant annual loss in all mature Douglas fir stands of the region. In some areas this loss is severe, while in others it is confined to small scattered groups or isolated trees. We know of no serious beetle outbreaks within the spruce forests of Region One, although in all mature stands there is an annual loss of scattered trees resulting from Engelmann spruce beetle attacks. We likewise have no records of serious mountain pine beetle infestations within the lodgepole pine stands of the region. However, on the Targhee National Forest, to the immediate south, it is apparent that there is a marked increase in mountain pine beetle activity in lodgepole. Within the lodgepole pine stands of the Teton National Forest and Caribou National Forest of Region Four, an epidemic exists which is truly comparable to the Big Hole Basin infestation of 1930. On the Caribou National Forest it is apparent that practically all trees above 8 or 10 inches in diameter will be killed during the next attack period (1946) unless the epidemic is checked by natural means.

As during the past few years our survey program has been greatly curtailed, we do not profess to have our fingers entirely upon the situation as it exists today. This condition is regretted as we realize that far more serious situations may exist than those of which we are cognizant.

SIGNIFICANCE OF FOREST INSECT DAMAGE TO PRESENT AND FUTURE FORESTS

It is not difficult to evaluate timber losses resulting from bark beetle activity in terms of present and future forest economy. Obviously, such an evaluation will vary with the character of the timber stand involved. When trees of a species which comprise a permanent forest type are killed by insects, their place in the stand composition is, in most instances, replaced by trees of the same species, so that the original forest type or stand composition is preserved. The volume of timber destroyed by insects is in time replaced by an increased growth of the residual stand and the new trees which replaced those destroyed by insects. Under such conditions, perhaps the only economic importance attached to insect depredations, in addition to the actual value of the timber killed, is the creation of an increased fire hazard with no permanent or even temporary change of forest type.

However, when insects attack and kill trees of a species which occupy a temporary position in a temporary forest type such as western white pine, a more serious evaluation follows. As such trees are killed, their place in the stand is taken by the tolerant tree species of the existing understory, which eventually becomes the predominating species of the climax forest type. When timber stands once previously stocked with adequate white pine reach an age of 300 or more years, a rather complete change of forest type will have occurred. Such stands will be stocked with old decadent hemlock and white fir with a few scattered white pine trees which in some manner established and held a dominant position against all environmental forces of destruction. All steps in this natural succession of tree species can be seen in existing, and "used to be" white pine stands of the region. The significance of timber losses under this condition involve not only the value of the timber killed, but the fact that undesirable timber stands are created which have little value aside from watershed protection.

To dispose of these practically worthless timber stands and restore the area to a timber productive status will be an expensive and laborious process. Intensive forest management offers means of preventing the development of these undesirable conditions which are the result of uncontrolled bark beetle activity.

ESSENTIAL NEEDS IN THE SOLUTION OF THIS PROBLEM

Obviously no steps can be taken in the solution of a forest insect problem unless it is known what and where the problem is. As our timber stands are placed under intensive management, the seriousness of the bark beetle problem will be materially reduced. However, as long as we have mature forests, and perhaps after forests are placed under best practices of management, there will be a need for artificial control. Such control cannot be properly planned or directed unless we know of insect conditions within all forested areas. Furthermore,

an accurate knowledge of insect conditions is indispensable to the planning and institution of desired practices of management. As a result, an initial requirement would be an adequate annual program of forest insect surveys. This program to be of sufficient intensity that the status of forest insect conditions within all forested areas is known at all times. However, such information would be of no economic value unless effective control measures were available, which could be properly instituted when and where needed.

During the past 35 years, approximately $750,000 has been spent for artificial control within the forests of Region One. This is but an average annual expenditure of $20,900, a sum totally out of proportion to the value of the timber destroyed. Furthermore, the inadequacy of appropriations for control has often resulted in the institution of ineffective projects.

In seeking to establish a program of entomological activities which will care for the insect problems of the Northern Rocky Mountains, there are three separate, but closely related phases of work for which adequate provision is essential. These requirements are as follows:

1. Additional research or study as essential in perfecting all phases of forest insect control. Research provides a foundation upon which both artificial control and the preventive efforts of silvicultural management must stand. The entomological problems of the region are far from being solved. Many questions still remain, the answers to which can only come from thorough fundamental studies.

2. An adequate program of forest insect surveys to permit the location of potentially destructive insect outbreaks during their early stages of development. With this information, control measures can be directed against insect outbreaks at a time when the greatest results will follow minimum expenditures of funds. Failure to recognize the early stages of dangerous outbreaks permit them to develop to such proportions that control measures are no longer feasible, and tremendous losses of timber occur.

3. Provisions for a proper institution of artificial control when and where needed. Without this provision, research directed toward the development of more effective artificial control, as well as surveys showing the location of insect epidemics in their early stages, becomes of little economic value.

PUBLIC COOPERATION IN FOREST INSECT CONTROL

Private timber holding companies have not participated to any great extent in past programs of forest insect surveys and control. However,

in those instances where cooperative projects have been conducted, the timber owners involved have contributed their share of the expense. It is believed that private timber owners are sincerely interested in their forest insect problems, and if there has been a lack of participation, it could be due to the fact that there has not been a definite plan of insect control upon public lands. If such a plan of surveys and control could be adopted, it is believed that proper cooperation would be received from private owners.

LEGISLATION

Oregon and California have or at least had forestry laws which authorized the state forester to conduct insect control on privately owned lands, when adjacent timber holdings were threatened by the insect infestation involved. The law provided for the cost of control to be spread upon subsequent tax rolls, but it is not known if this authority has ever been used. I do not know if such laws are advisable, however, it is believed that the extension of federal aid to private owners in connection with forest insect control is fully warranted.

CONCLUSION

In concluding this summary of the insect situation, it is regretted that data were not available which would have permitted the submission of accurate loss figures. It is trusted however, that in its present form it will bring about a more thorough realization of the importance of the forest insect problem and the necessity for its solution in a successful practice of forestry.

James C. Evenden,
Senior Entomologist.